

PE 73-1

PE-073-01

PRELIMINARY REPORT OF GOLDEN HORN MINE,
IDITAROD MINING DISTRICT, ALASKA,
August 23, 1937.

PE 73-30

Location:

The Golden Horn Mine is located on the left limit of Otter Creek upon a flat bench between the valley of Slate Creek and Glen Gulch, three miles east of Flat, Alaska.

The group of six claims; namely, Comstock, North Star, Murie, Divide, Golden Horn and Victor, extends in a southwesterly direction from the valley of Otter Creek between elevations of 600 to 850 feet above sea level.

Owners:

The present owners are Gustus Johnson, P. Savage, R. Nielsen and Minnie Warren Engquist. Mr. Johnson now owns the controlling interest with a total of 52 per cent.



Gustus Johnson

NOTED
JAN 25 18
B. D. STEWART
Commissioner of Mines

History and Development:

The actual discovery date and by whom is not definitely known of these veins. However, they were discovered a few years after the discovery of placer gold on Otter Creek by J. Beaton by placer miners mining in Glen Gulch. Maddren, A. G. speaks of these stibnite-cinnabar veins in U. S. G. S. Bull. 622, "Gold Placers of the Lower Kuskokwim," 1915, p. 359, as:

"Several small veins (stibnite-cinnabar) have been observed on the lower part of Glen Gulch. In these veins stibnite is the most abundant metallic mineral, and the cinnabar occurs as flakes and blebs associated with quartz."

The discoveries above Glen Gulch were known as on the Mohawk claim and are described by Brooks, A. H., U. S. G. S. Bull. 649, "The Antimony Deposits of Alaska," 1916, p. 649.

The old workings on these discoveries were reported by Gustus Johnson to have been mainly done in the year of 1912.

The vein upon which the recent development has been done, was discovered in 1921 by Rasmus Nielsen in driving a short prospect tunnel. The same year Nielsen took Jerome Warren in partnership and together they sank a 50-foot shaft on the vein and on this level drifted 200 feet southwest and 80 feet northeast on the vein. They also drove the cross-cut tunnel and connected up with the 50-foot level. In the winter of 1922 they sank the No. 2 vertical shaft to a depth of 128 feet. This shaft is located only 35 feet east of the No. 1 shaft. On the 128-foot level, or third present level, they drifted 37 feet northeast and 30 feet southwest. (No. 1 shaft now partly filled is not shown on sketch). Intermittent mining continued until 1925, which year a 10-ton shipment of ore was made to the Tacoma Smelter. This ore was stoped from between the first, or 50-foot level, to the surface on the northeast side of the shaft. Smelter returns of this ore were examined and the ore was found to average \$394 per ton in gold and silver.

During the year 1934 W. E. Dunkle optioned the property on a royalty basis and formed the Golden Horn Mining Company. Operation started August 1 of the same year under the management of B. B. Neiding. The No. 2 shaft was sunk from the 128-foot level a hundred feet to the 228-foot or fourth level, the present depth of the mine. On this lower level a drift was driven 350 feet southwest and 80 feet northeast. A

double-compartment raise was driven from the fourth level to the 50-foot level. Drifting was done on the second and third levels and considerable stoping was done between the levels. On No. 2 level approximately 40 tons of ore were taken out and shipped. Development and mining ore continued until July 1, 1935, at which time the option was dropped.

It was further reported by Mr. Johnson that during this operation by the above company approximately 250 tons of ore was shipped that averaged, according to royalties paid, between five and six ounces of gold per ton.

Mining and stoping followed by the owners the spring of this year at which time a disagreement suspended operations, and the mine since has been idle.

On the date of visit the mine was filled with water to the 50-foot level and the lower workings were not accessible.

Three shipments of ore have been made by the owners since July 1, 1935. All information regarding the lower levels and smelter receipts was furnished by Gustus Johnson, owner. He also furnished information regarding the depths of the old shafts and the vein widths in the Divide claim. (Note Plate No. 1).

Total underground workings on the Golden Horn claim are as follows:

No. 1 and No. 2 shafts - total	303	feet
Drifts	" 1025	"
Crosscuts	" 300	"
Raise	180	"
Less stopes, total	1808	"

Total old workings on Divide claim - two old filled shafts down 25 and 40 feet, total 65 feet, and several pits on the veins to bedrock, now filled.

Geology and Showings:

All veins, the Golden Horn vein, the veins in Glen Gulch, and the Divide claim, are in blocky monzonite ranging two to three thousand feet from a basalt and shale contact. A sample of the monzonite taken from the Divide claim near the veins and three thousand feet from the contact shows in thin section a typical augite-olivine monzonite, with composition percentages in order of abundance, plagioclase feldspar, followed by augite, olivine, brown pleochroic biotite and an occasional crystal of quartz and orthoclase.

A sample taken on Glen Creek near the contact shows a lighter color of grayish brown and in thin section shows a larger percentage of altered orthoclase and quartz and no biotite. The olivine shows an alteration on the ends of some crystals. This latter sample shows a more acidic phase of the monzonite and it is in this phase that the veins have their greatest widths of quartz. The Golden Horn vein is between these two phases.

Greenish dikes were reported cut by the north drift in the crushed and faulted area and the vein was reported as splitting into small high grade stringers. Since this area was not accessible, their character and extents were not determined. However, a sample found on the dump which was identified as a piece from one of the dikes showed in thin section as consisting of mainly broken and fractured augite, some feldspar, quartz and a little calcite. This no doubt is a contact phase of the monzonite.

The Golden Horn vein does not outcrop on the surface which is covered with heavy residual deposits of weathered monzonite. On the 50-foot level the vein is exposed except for timber and stoped areas over a distance of 300 feet and its average width is nearly one foot. It has nearly a vertical dip and strikes N. 40° E. The walls are free altered and decomposed monzonite and an upthrust movement shows on the hanging wall. Small slip faults are common due to fractures in the blocky monzonite and a vertical fault with a displacement of seven feet cuts the vein at a point 170 feet southwest of No. 2 shaft. This fault with displacement and distance from the shaft was reported as existing on the lower levels. Only a small amount of ore was found past this fault to the southwest. An occasional small roll action was noted along the vein due to thrust movement and places were reported where the vein splits into stringers. The range in width was reported to be from 5 inches to 18 inches.

Following the vein to the northeast from the shaft, a faulted and broken area was encountered and due to water and poor pumping facilities, development was not carried further. However, the best ore was found between the shaft and this area. Plate No. 2 shows the representative values of the ore stoped, which shows a gradual decrease in value in depth. However, the vein widens to an average of 18 inches as reported on the fourth level. The cause of the general decrease is, with the small amount of development work, inexplicable at present.

Very little could be determined regarding the veins on the Divide claim and Glen Gulch. The shafts were filled, as also were the cuts. However, from large pieces of quartz from the dumps, samples were taken which showed representative widths of the quartz in the veins.

A. H. Brooks gives an account of these veins in Bull. 649, "The Antimony Deposits of Alaska," pp. 47-49, in describing the Mohawk claim now the Divide, as follows:

"The Mohawk claim is located on the flat summit, covered with moss and timber (now burned), between Glen Gulch and Slate Creek where no bedrock is exposed.

"The lode appears to trend northeastward, which is parallel to the major structure of the sediments. It dips 45° SE. A shaft said to be 35 feet deep and a few pits are the only openings seen on the lode.

"The width of the lode is reported to be 2 to 2½ feet."

Of the mineralization the bulletin further states:

"The ore consists of an intergrowth of quartz and stibnite, and it is reported the stibnite occurs chiefly as granular aggregates with some columnar masses. Vitreous quartz is rather evenly distributed along the stibnite in grains, in partly developed crystals, and in irregular aggregates.

In this section this bulletin states:

"The noteworthy feature is that the deposition of the sulphide has taken place after the crystallization and deformation of most of the quartz."

Concerning Glen Gulch and Black Creek veins the above bulletin states:

"Both veins strike about N. 60° E. and their relative position indicates that they may be in the same zone of fracture, but they are separated by a distance of about 500 feet in which the bedrock is not exposed. They probably both stand nearly vertical, but as only traces of the veins are exposed on the bedrock surface, and as no prospecting had been done on the deposits, their attitude could not be definitely determined. These veins occupy fissures in the monzonite which forms the bedrock of the creek. They are filled with quartz and range in thickness from 2 to 12 inches, probably averaging about 4 inches."

The Golden Horn vein also occupies a fissure which strikes more northerly, however, these fissures may be single shears of a major shear zone. Lack of outcrops of bedrock make for hard tracing of these veins and obtaining structural data.

Mineralization:

Maddren mentions these veins in Glen Gulch as stibnite-cinnabar veins.*

Brooks mentions and describes the same veins as stibnite lodes** as:

"Stibnite is the principal metallic mineral and appears to have been deposited after the quartz. A little cinnabar is associated with it and also some pyrite."

These veins with their associated mineralization of cinnabar, stibnite and others, and being associated with a soda monzonite are classified as of the late type or period of metallization.*** These late periods of metallization are classified as of Eocene or Post Eocene in age.

In the Golden Horn vein the mineralization is less stibnite with greater amounts of arsenopyrite, pyrite, chalcopyrite and small amounts of galena and sphalerite. Besides scheelite, a green stain is reported to be an oxide of nickel.

The gangue minerals are white milky quartz, vitreous quartz, calcite, feldspar, chlorite and decomposed wall rock minerals.

From the dumps of the veins in Glen Gulch and the Divide claim considerable massive stibnite occurs with quartz. This apparently occurs in bunches and masses along the vein. Gold as noted in assays (note sketches Nos. 1 & 2) is associated with this mineralization in profitable amounts. It is not visible in unaltered ore.

A thin section of the ore, mainly quartz, shows two generations of quartz. The cloudy white quartz shows poor crystal structure and contains the mineralization. The vitreous quartz is clear and shows well developed crystal form.

*Op. cit., p. 2.

**Op. cit., p. 2.

***U. S. G. S. Bull. 739, "Criteria for Age Determination of Periods of Metallization, Interior of Alaska," by J. B. Mertie Jr., p. 152.

The ore as mined is complex and while a concentration process such as flotation would be an advantage, the tonnage has not been great enough to warrant. As a result the ore has been shipped direct to the smelter at Tacoma. A smelter assay of a 29,272 pound shipment in the fall of 1935 gave the following results per ton: Au. 6.29 oz.; Ag. 6.59 oz.; Pb. 1.0 per cent; Zn. trace; As. 10.33 per cent; Sb. .24 per cent; Ni. trace; Cl. trace.

Assays and Production:

Since the lower workings were filled with water, it was impossible to obtain samples. The estimates of values on Plate No. 2 were taken from smelter shipment receipts. The assays of the fourth or lower level were given by G. Johnson, who was mining under B. B. Neiding at the time this work was done. A sample taken from a piece of massive arsenopyrite ore reported in the bottoms of the drift on the lower level near the fault 170 feet southwest of the shaft gave a gold assay of 17 oz. of gold per ton. This massive ore was reported as 8 inches in width and 15 feet in length.

Samples taken from the surface workings (note Plate No. 1) were mainly dump grab samples and channels taken from large quartz pieces.

Approximate Production, Golden Horn Mine,
1925 to March, 1937.

<u>Date</u>	<u>By Whom</u>	<u>Amounts</u>	<u>Approximate Returns</u>
1925	Owners	10 $\frac{1}{2}$ tons	\$4,159.75
1934-35	Golden Horn Mining Co.	250 tons	50,000.00
1936	Owners	15 tons	2,927.16
	"	6 tons	707.35
1937	"	<u>40</u> tons	Returns not received
	Total production	321 $\frac{1}{2}$ tons	

The gold return value paid by smelter was \$32.8166 per ounce.
The price paid for silver was .75 $\frac{1}{2}$ per ounce.

Machinery, etc.:



Showing combined boiler and shaft house with small store house in front, Golden Horn Mine, Flat, Alaska.

The machinery installed by the Golden Horn Mining Company was removed as per terms of the option. The remaining machinery, rather old but usable, consists of a 60 H. P. Erie boiler and Atlas 10x12" single steam engine connected to American Hoist and Derrick Company double drum hoist. Blacksmith tools and small mining tools remain.



Showing good gravel road to mine, bunk house, office, etc., Golden Horn Mine.

The above bunk house has two stories, with mess hall and kitchen below, and large enough to accommodate 20 to 25 men.

Timber and Water Power:

The timber in the vicinity has been burned by forest fires and most of the remaining timber surrounding this district has been cut over by the placer operators. Sufficient timber could be obtained on upper Otter Creek a distance of 10 to 15 miles.

Nearly all the water and small water power is utilized by the placer interests in the district. The small water power site located on Plate No. 1 is utilized by the Miscovich placer interest on Otter Creek. Thus operators of the mine would have to establish diesel or steam power for operations under present conditions.

Transportation:

A good gravel road extends from the mill three miles to Flat and to water transportation at Iditarod. Rates per ton by truck are \$5 from mine to Iditarod. Costs of shipping from Seattle to Iditarod are: Machinery \$85 per ton; all other freight \$100 per ton. Cost of shipping ore from mine to Tacoma totals \$28 per ton - \$5 per ton, mine to Iditarod, and \$23 per ton, Iditarod to Tacoma.